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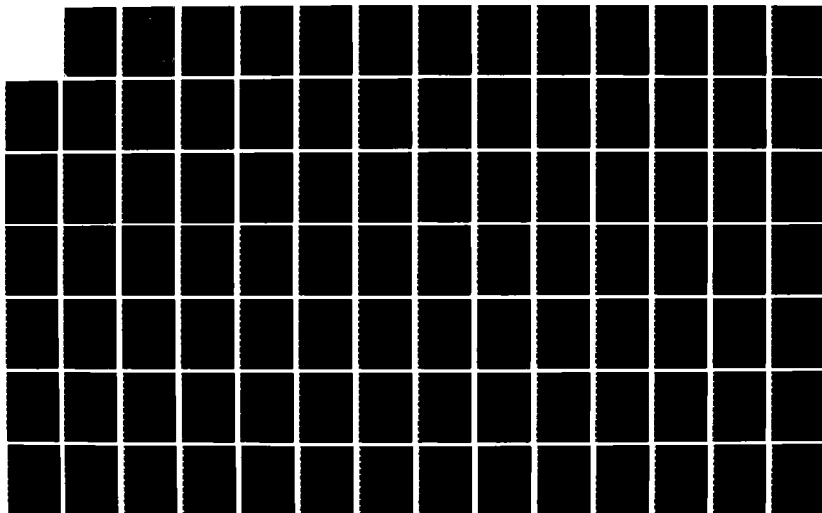
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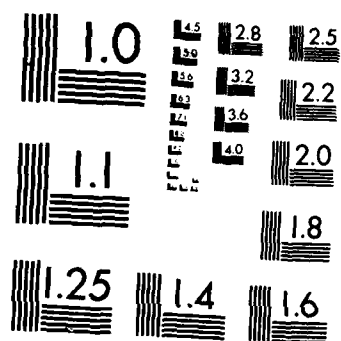
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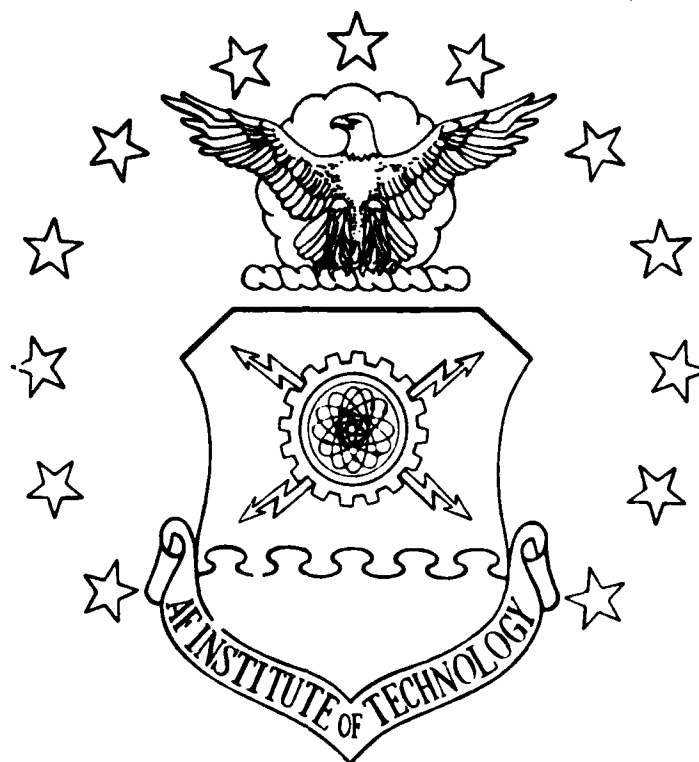




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AN INVESTIGATION OF PERSONAL BACKGROUND
FACTORS RELATED TO THE CIVIL
ENGINEERING OFFICERS' SATISFACTION WITH
THE AIR FORCE WAY OF LIFE

THESIS

John K. Borland
Captain, USAF

AFIT/GEM/DET/86S-4

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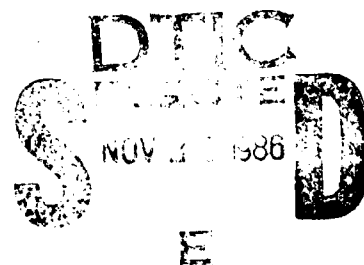
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THESIS

Presented to the Faculty of the
School of Systems and Logistics
of the Air Force Institute of Technology
Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Engineering Management

John K. Borland
Captain, USAF

September 1986

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Abstract

↙ The intent of this research was to gather sufficient data to determine the relationship between personal background and the Civil Engineering officer's satisfaction with the Air Force way of life. A total of 809 Civil Engineering officers were surveyed to gather demographic and personal background information and to assess their level of satisfaction with the Air Force. The relationship between personal background and satisfaction was investigated using a one-way analysis of variance (ANOVA) between satisfaction and each factor of personal background. The results identified seven factors that are related to satisfaction with the Air Force. These factors were student council involvement, father's education, mother's education, age first considered an Air Force career, strictness of upbringing, perceived background adequacy, and the home town image of the military officer.

↑

AN INVESTIGATION OF PERSONAL BACKGROUND FACTORS
RELATED TO THE CIVIL ENGINEERING OFFICERS'
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THE AIR FORCE WAY OF LIFE

I. Introduction

Overview

Chapter one consists of a brief background on the high attrition of civil engineers during the early 1980's and the possible causes of this. This chapter also includes a brief description of the behavioral model that was tested by this research. The research objectives are discussed and the personal background factors that were investigated are identified. Finally, the justification, scope and limitations, and definitions are discussed.

Background

A recurring problem within Air Force Civil Engineering is the retention of qualified officers after they have fulfilled their initial commitment to military service. During periods of high attrition, the Air Force has maintained manning in Civil Engineering officer positions by "front-loading" the system with lieutenants by as much as 237% (14) in an effort to offset the losses of the higher ranks. With this shortage of captains and above, there is

no alternative but to place the less experienced lieutenants in vacant middle-manager positions. This situation provides valuable experience and high visibility for the younger officers; however, it would also seem to lead to a less efficient and less effective organization (5:2).

Several studies have been done to determine the reasons for this high attrition rate of junior officers. The recurring significant factors include Air Force assignment policies, personnel policies, salary, and the civilian job market or economy. The first three are directly related to the young officers' job expectations and need satisfaction. In an attempt to retain Civil Engineering officers, the Air Force has instituted compensation packages, including a monetary bonus for engineers who remain on active duty after their initial four-year commitment. While these special considerations do offset the attractiveness of a lucrative civilian economy to some degree, they do not reduce attrition based on other factors such as satisfaction and motivation. It is this factor of satisfaction that is the focus of this research.

The basic model of behavior developed by Martin Fishbein and Icek Ajzen may be described as four levels of development. These levels are the development of 1) beliefs, 2) attitudes, 3) intent, and 4) behavior (1:8). Most of the research in this area focuses on predicting individual behavior given a specific system of personal beliefs. Further research in this area describes personal

background as an instrument of the development of a particular system of beliefs. Therefore, factors of personal background may preceed the development of beliefs in Fishbein and Ajzen's model of behavior. Since other factors may influence intent and behavior, this research effort was limited to personal background as an objective surrogate for values and attitudes in terms of satisfaction.

Problem Statement

Little is known of the relationship between the Civil Engineering officer's personal background prior to military service and his satisfaction with the Air Force way of life. Since the attrition of Air Force Civil Engineering officers is often related to dissatisfaction with a military lifestyle, understanding this relationship could prove valuable as an aid in identifying those engineering candidates that are most likely to be satisfied with the Air Force.

Research Objectives

This research will investigate the relationship between the Air Force Civil Engineering officers' personal background prior to military service and satisfaction with the Air Force. This research will also identify those factors of personal background that have the strongest relationship with satisfaction.

Objective #1. The first objective of this research

effort is to identify the personal background factors that are related to satisfaction with the Air Force. The following factors which may be related to satisfaction with the Air Force will be investigated:

1. Type of high school (public or private)
2. Junior ROTC
3. Sports
4. High school clubs
5. Student council
6. Girl/Boy Scouts
7. Parents' military service
8. Number of brothers and sisters
9. Parents' level of education
10. Single parent
11. Age when first considered Air Force career
12. Size and geographical location of home town
13. Living overseas
14. Frequency of moves as a child
15. Frequency of travel as a child
16. Jobs held while in school
17. Fostering of independence
18. Parent permissiveness
19. Perceived background adequacy
20. Image of military in home town

Chapter three discusses each of these factors in greater detail. The following Research Questions will direct the approach to Objective #1:

1A. What are the general attitudes of Civil Engineering officers toward the Air Force way of life in terms of satisfaction?

1B. What factors of the Civil Engineering officer's personal background prior to military service are related to his or her satisfaction with the Air Force way of life?

Objective #2. The second research objective is to identify which factors of personal background are statistically significant in relation to satisfaction with the Air Force. The following Research Question will guide

the approach to this objective:

2. What factors of personal background are significantly related statistically to satisfaction with the Air Force?

Justification

During periods of high attrition of Civil Engineering officers, the Air Force loses a wealth of corporate knowledge, as well as highly trained personnel. These losses are not only costly to the government monetarily, but they also cause Civil Engineering management positions to be filled with the younger and less experienced officers.

As previously stated, an understanding of the relationship between the personal background of Civil Engineering officers and their satisfaction with the Air Force could prove a valuable aid in identifying candidates who are the most likely to be satisfied with the Air Force way of life. Therefore, the attrition rates of future Civil Engineering officers may be reduced if their personal background indicates a higher probability of satisfaction with the Air Force.

Scope and Limitations

While the basic model of behavior to be examined includes the development of beliefs, attitudes, intentions and behavior, this research effort will focus on personal background as a predictor of beliefs and attitudes in terms of satisfaction. To include the factors of intent and behavior would not be feasible for a single research effort

since this would require an in-depth investigation of external factors that may affect behavior. For example, an officer may be highly satisfied with the Air Force but may decide to separate for reasons such as pay, promotion, or family requirements. Therefore, the intention and behavior link in the behavioral chain could be better addressed in a separate research effort.

Only Air Force Civil Engineering officers in the 55XX career field were included in this study. For ease of data collection, only those officers stationed in the continental United States were included. While Civil Engineering officers stationed overseas may be more or less satisfied than their counterparts stationed in the continental United States, it was assumed that this would relate more to specific job satisfaction and would not significantly affect satisfaction with the Air Force.

Definitions

The definition of satisfaction used in this study is "the internal state resulting from the positive or negative feelings of one's situation [2]."

For purposes of this research, personal background factors are those factors of upbringing, or growing-up, that shape future values and beliefs. The specific factors were listed in the Research Objectives section of this chapter.

II. Literature Review

Introduction

Chapter two describes the development of personal values that ultimately relate to the individual's beliefs, attitudes, and behaviors. This chapter also describes past research conducted on the relationship between personal background, personal values and job retention.

Value Development

Psychologists who have done research in the development of beliefs and values tend to disagree about the mechanics of the process, but they do agree that it is a building process based on early observations and experiences. The consensus of the experts is that the most important period of value development occurs between infancy and about seven years of age and is known as the imprinting phase (13:9). It is during this time that the child forms the basis, or foundation, upon which all other beliefs and values will be built. They also theorize that the basic values formed during the imprinting phase are the most resistant to change and the values developed later in life are less resistant (21:3). According to Massey, while an individual's value system is locked in from the age of 21 and up, a shift in this value system can be caused by a significant emotional event (13:237). Jean Piaget, an expert in the area of value

development, contends that each stage of value development not only builds upon previously established values, but is also more complex and is related to the previous thought processes. Piaget constructed a general development model summarized as follows:

1. There is an invariable order of the stages of development.
2. No stage can be skipped.
3. Each stage is more complex than the preceding one; it represents a transformation of what existed before in a new form.
4. Each stage is based on the preceding one and prepares for the succeeding one [3:9].

Although values can change with time, this is usually not the case and they would seem to be reasonably accurate predictors of future beliefs and attitudes. According to Stephen Robbins, "Values are relatively stable and enduring. The values you hold today are likely to be very similar to those you held last year and the ones you will hold in future years [20:9]."

If a person's values fit the values of the organization, expressed in company policy, the opportunities for job satisfaction are increased (23:18). This position is supported by Greenhaus, Seidel and Marinis in their research of the impact of values on job attitudes in which they state, "The more closely the person's job experiences meet [his relatively fixed set of values] the higher the level of job satisfaction [10:396]." Job satisfaction would

also tend to increase where co-workers share common values. For example, in the Air Force, one of the most prevalent common values among officers is patriotism. These shared values tend to unite the personnel in the organization toward the common goal, if the values are also in line with those of the organization (23:14). Admittedly, just because an employee is satisfied with his or her work is not necessarily advantageous to the organization in terms of productivity. However, Robbins contends that since values influence attitudes, the individual's job satisfaction and performance will probably be greater if his personal values match those of the organization (20:24).

Personal Background, Values, and Behavior

One study done by the Department of Defense (DoD) closely parallels this research effort. The DoD study, known as the Educational and Biographical Information Survey (EBIS), was designed to test the use of personal background information as a predictor of future behavior in terms of success in the service (16:1). The EBIS was administered to approximately 75,000 enlisted recruits and applicants. The validity testing of the survey is still ongoing (16:6-7). In effect, the EBIS is skipping over the first three influences of behavior in Fishbein and Ajzen's model (beliefs, attitudes, and intent) and is trying to make a direct link between background and behavior, in this case, success in terms of promotion, reenlistment and attrition.

Several studies have been done on the retention of military personnel and some specifically directed at the Air Force Civil Engineering officer (18; 17; 22; 7). However, none of these studies focus on the link between personal background, beliefs, attitudes and behavior (retention). Most of these studies are based on economic factors such as compensation packages and the state of the national economy. Since the state of the economy fluctuates erratically, these types of studies would not be useful in determining potential attitudes over a long period of time. This is readily pointed out by Quester and Thomason in their study on the effects of the civilian economy on military retention using data from Navy enlistees, "These models, most successful in forecasting the short-term effects of different pay packages on reenlistment rates, are not designed for longer-term projections [17:86]." Their research concluded that there is a definite relationship between the economy and military retention for the Navy. Studies done concerning compensation packages and bonuses do not prove beneficial to research concerning the link between background, values and attitudes. Instead, economic factors are an influencing variable affecting the behavioral aspect of Fishbein's model, rendering the study of behavior inappropriate for this research effort. In fact, some studies have shown an inverse relationship between economic incentives and enlistments:

Two studies (22:255-259) of the intentions of civilian males 16 to 22 years of age to enlist in the Navy found that when cash and education incentives were increased in number or value, no statistically significant increase occurred in enlistment. If fact in a few cases increasing the value of the incentives led to lower intentions to enlist. The investigators hypothesized that very large incentives may create recruitee distrust, or that a threshold level exists beyond which no additional incentives are effective [5:5-6].

Very few studies have been done that relate personal background to satisfaction with the organization and retention rates. One such study was conducted with respect to retail salesmen (4). Cotham studied the use of personal history information in the selection of retail salesmen. However, Cotham focuses primarily on the relationship with job performance and does not address a relationship with retention. His study also uses personal background data that is provided on application forms, and is therefore a test of the validity of the form itself. One interesting point brought out by Cotham is the use of performance ratings as a personal background characteristic. He points out that performance ratings may have been subject to halo error by the evaluator by focusing on a few characteristics in the overall evaluation (4:38). This halo error, or the tendency to draw a general conclusion based on limited observation (11:202), can have a tendency to skew the relationship. It should be noted that this study refers to a very specific group of employees located in the midwestern United States (4:32). Therefore, any significance of the

findings will be restricted to this group and their own particular system of values and beliefs.

Another study done similar to Cotham's involves the use of family background as a predictor of educational and occupational achievement (12). Like Cotham, this study investigates the relationship between personal background and success and does not address the issue of satisfaction or retention. In terms of occupational attainment, the study does indicate a relationship with family background, but it is not as prominent as the one between background and educational achievement. While this study focuses primarily on the relationship between parental education and the individual's educational achievement, it does bring up an important point that can be related to Air Force members. The research showed a positive correlation between parental education and individual educational attainment (12:91). This finding would seem to indicate the presence of similar value or belief sets among parents and their offspring.

Neither of these two studies regarding personal background indentify specifically with satisfaction or retention. If the factors of performance and success are viewed as productivity measures, it would seem intuitive that there would exist a positive relationship between high productivity and satisfaction. However, previous studies have failed to establish this relationship (2).

Most of the research in this area has not been limited to personal background prior to entrance into an

organization. Instead, these studies tend to cover a broad spectrum of background characteristics up to and including characteristics acquired after entrance to the organization. One possible reason for the scarcity of available research is the difficulty that lies in data collection. Some of the most accurate information concerning personal background and its relationship with beliefs, and ultimately retention, would actually come from those who have left an organization because of their value conflicts with that organization. Since the collection of this data would be very difficult, if not impossible in most cases, research of the background/satisfaction relationship must be based primarily on those individuals who intend to remain in the organization, at least in the short term. Additionally, studies of this type tend to be very specialized or focused on a particular group or organization since the value system differs from organization to organization. These studies may still hold significance in similar studies of Air Force Civil Engineering officers since the principles of the research remain constant and the value system becomes modified to a certain extent.

Summary

This chapter discussed some of the research that has been done in areas similar to this effort. First, research efforts in the area of value development through personal background and experiences were identified. The general

consensus of the experts is that beliefs and values are developed early in life and continue to develop. These beliefs and values result from the experiences and observations of the individual. While there is some disagreement among the experts, they generally agree that these personal beliefs are subject to change with time, but they tend to remain relatively stable and enduring unless altered by a significant emotional event. Early value development therefore tends to be indicative of present or future values.

Second, some of the research conducted on the relationship between background, beliefs, attitudes and behavior was discussed. An individual's personal beliefs shape his attitudes and they ultimately affect his satisfaction and performance. Retention would seem to follow as a natural consequence of high job satisfaction, however, more research is required in this area due to the other external factors that may drive behavior. There have been several studies on military retention but none of these use personal background as a basis. They tend to rely heavily on economic considerations. Other studies have been conducted in the area of personal background but these studies mainly reflect the relationship with performance or success in the job. Additionally, these studies tend to be very restrictive in their applications and limited to a particular group or organization.

Chapter three will discuss the methodology used in the approach to this research effort in order to answer the research objectives.

III. Methodology

Introduction

This chapter describes the approach used to answer the research questions identified in Chapter one. The population and sample for this research are discussed, followed by a brief description of data collection and the survey instrument. Next, the personal background factors that are hypothesized to relate to the Civil Engineering officer's satisfaction with the Air Force are discussed. Finally, the statistical analysis techniques used in this research effort are discussed, as well as how these techniques were applied in answering the research questions.

Population and Sample

The population for this research effort consisted of approximately 2230 Air Force Civil Engineering officers with the 55XX Air Force Specialty Code (AFSC) (8). This included the 5521 entry level code, the 5525 fully qualified code, and the 5511 and 5516 codes for engineers in command positions. The population was limited to Air Force Civil Engineering officers in an attempt to focus on individuals with similar value systems.

A sample was chosen over a census investigation primarily because of economic considerations and time constraints. An evaluation of a sample is much more economical than that of a census, and sampling produces

results much faster than a census. However, there is always the concern that the sample chosen may not be truly representative of the population (9:276). This concern can be greatly reduced by choosing a sufficiently large sample by random selection.

A minimum sample size of 700, or approximately 31% of the population, was chosen after consulting with statistician Professor Dan Reynolds, School of Engineering, Air Force Institute of Technology, on the appropriate statistical techniques to be used (19). Based on an expected return rate of approximately 50%, subject names were generated from the computerized data base at the Air Force Military Personnel Center (AFMPC) by restricting the last digit of the social security number (SSN) as follows:

<u>Grade</u>	<u>Last Digit SSN</u>
0-1/0-2	0,1,3,4,6,8,9
0-3	0,1,2,4,5,6,8,9
0-4	0,1,2,3,4,5,8,9
0-5	0,1,3,4,5,7,8,9

The last digits of the SSN were selected by the use of a random number generator and in proportion to the number of responses needed for a sample that was representative of the population. For this sample to be representative, the ranks of the respondents should be in approximately the same proportions in the sample as they are in the population. These proportions for the sample and the population are presented in Chapter four. In addition to the above

requirements, only officers stationed in the CONUS were surveyed for ease of data collection. This process generated 1260 names, excluding those that were data masked (no address given) by the computer. Subtracting the 14 surveys returned due to permanent change of station (PCS), discharge and incorrect addresses, 809 individuals responded within the required time frame for an actual return rate of 65%.

Although the true population may not be represented in the sample because of the CONUS-only constraint, it was felt that this would not significantly bias the results. If a difference in satisfaction exists between officers stationed in the CONUS and those stationed overseas, this would reflect satisfaction with a particular job or assignment and would not significantly affect satisfaction with the Air Force way of life.

Data Collection

Emory points out that there are two methods for the collection of primary data. These are direct observation and surveying (9:157). Since this research solicited information on personal background and attitudes, the more appropriate vehicle for the collection of this type of data was that of the survey. The three methods of conducting a survey are personal interviews, telephone interviews, and mail surveys. Personal interviewing was disregarded due to economic and time constraints. Telephone interviewing was

discarded because of the time requirements for such a large sample. Therefore, the method of data collection that proved the most feasible for this research was the mail survey. Some of the advantages of using a mail survey include lower cost, more accessibility to respondents, and greater anonymity (9:172). The most important of these to this research was that of anonymity so as to encourage the respondents to answer each question as honestly as possible. Some of the drawbacks of a mail survey include nonresponse and limited information gathering, however, these drawbacks did not detract from this research effort.

Survey Instrument

The survey developed for this research consisted of 59 questions of three different types: demographic information, personal background, and attitudes toward the Air Force. The answers to the questions consisted of multiple choice (nominal), ordinal, and interval scaling responses. The demographic questions were entirely multiple choice and were used to categorize the respondents in terms of sex, rank, age, type and source of commission, current major command, level of assignment, and geographical location. The personal background questions are primarily multiple choice, but do include nine ordinal scaled responses. Several of the background questions that were taken from the Educational and Biographical Information Survey (EBIS) were reworded so the responses could be recorded on the machine

scored response form (AFIT Form 11B). The questions concerning satisfaction with the Air Force are exclusively interval type responses. A reproduction of the survey instrument is included in Appendix A.

The survey instrument was not pretested before distribution due to the input previously received from Civil Engineering officers and the EBIS in the development phase of the survey instrument. Before the survey was distributed, it was reviewed and approved by AFMPC personnel on 28 April 1986. AFMPC assigned a Survey Control Number of 86-54 and the surveys were mailed during the month of May 1986.

Factors Related to Satisfaction

Twenty personal background factors were hypothesized to be related to satisfaction with the Air Force. This section identifies each of these factors and includes a short definition where needed and the reason the factor was considered.

1. High School. The type of high school an individual attended may influence his or her fit to the Air Force way of life. In addition to public schools, attendance at church sponsored private schools, private military academies and nonaffiliated private schools was investigated.

2. Junior ROTC. Early exposure to and involvement in a high school junior Reserve Officer Training Corps (ROTC) program may influence one's satisfaction with the Air Force

way of life.

3. Sports. The types of sports (team as opposed to individual, etc.) an individual participated in during high school may also be related to his or her satisfaction with the Air Force.

4. High School Clubs. Similar to sports, involvement in school clubs may have an affect on an individual's satisfaction with a military lifestyle.

5. Student Council. Involvement in the high school student council may influence future satisfaction. If an officer is not comfortable with leadership, he may be less satisfied when placed in those positions.

6. Girl/Boy Scouts. Participation in scouting is an early introduction to a regimented way of life. An individual who belonged to either Girl or Boy Scouts may be more comfortable and satisfied with the Air Force way of life.

7. Parents' Military Service. If an individual's parent served in the military, he or she may be accustomed to that lifestyle and may be more satisfied with it. Also, if a parent served in the Navy, that parent would have been away from home quite a bit, which may affect the offspring's satisfaction with a military lifestyle.

8. Brothers and Sisters. The number of brothers and sisters a person had at home while he or she was growing up may influence how that person relates to others in a close environment. It may also teach that person to live with

compromise.

9. Parents' Education. The level of the parents' education may have a significant impact on a person's satisfaction with the Air Force lifestyle.

10. Single Parent. If an individual was raised by one parent, either the mother or the father, satisfaction with the Air Force may be influenced.

11. Age First Considered Air Force Career. The age at which the Civil Engineering officer first considered a career in the Air Force may be related to his or her satisfaction while on active duty.

12. Size and Location of Home Town. Although this is a very mobile society, the size and location of the individual's home town may affect the development of his or her beliefs, and may therefore be related to his or her satisfaction.

13. Living Overseas. The number of years, if any, the individual lived out of the United States as a child may ultimately affect his or her satisfaction with the Air Force.

14. Frequency of Moves. If the Civil Engineering officer moved often as a child, he or she may be satisfied with that lifestyle and may view remaining in one area for an extended period as being too stagnant.

15. Frequency of Travel. The officer that may have lived in one place as a child, but traveled quite a bit, may be more satisfied in a job that offers the opportunity to

travel and move around.

16. Jobs Held During School Years. An individual who usually worked throughout the school year, whether he had to or not, may be more satisfied with higher responsibility.

17. Independence. The parents' fostering of independence in the child may be related to that person's satisfaction with the Air Force way of life.

18. Parent Permissiveness. Whether or not the individual had a strict upbringing as a child may be related to his or her satisfaction with the Air Force's regimented lifestyle.

19. Background. Whether or not the individual feels his childhood background prepared him well for a military career may be related to his satisfaction with the Air Force.

20. Home Town Image of the Military Officer. Since a person's beliefs and values are shaped by those around him, he may be more satisfied with the Air Force if his hometown has a positive attitude toward the military officer.

Data Analysis

Before the data can be analyzed, the types of data used in the research must be identified. This thesis deals with nominal, ordinal and interval data.

Nominal data can only be separated into catagories. A nominal type response can always be recorded in one of these catagories. As Emory states, "When you use a nominal scale,

you partition a set into subsets or catagories that are mutually exclusive and collectively exhaustive [9:87]."

This means that the nominal scale must incorporate all possible responses. Since this research effort is exploratory in nature, nominal scale responses were the most appropriate for the demographic and background information (9:88). For example, a demographic such as sex is catagorized as male or female with neither response holding more significance than the other.

The ordinal scale was used for certain aspects of personal background that required an order to the responses. While ordinal data does not necessarily have equal interval lengths, it does represent the concepts of "greater than," "less than," and "more than." The responses to the survey (Appendix A) that incorporated ordinal data include: frequency of moves and travel as a child, strictness of upbringing, and parental permissiveness, to name a few.

The interval data for this research came exclusively from the responses to the questions on satisfaction with the Air Force. The key difference between ordinal data and interval data is the equality of the distances between the responses (9:91). This equality of distance is the basic assumption for the analysis of the satisfaction responses. The techniques used to analyze satisfaction are discussed later in this chapter. Both the ordinal and interval responses were recorded using a five-point Likert scale.

Hypothesis Testing. When the researcher chooses a

random sample from a population in order to describe that population, the degree to which the sample represents the population can never be 100 percent. Instead, the researcher must form a hypothesis about the population and must then test this hypothesis using statistical methods. The result of the test is expressed in terms of the probability of success or failure.

A hypothesis test consists of two separate hypotheses: the null hypothesis (H_0) represents the current belief or the status quo, whereas the alternate hypothesis (H_a) is tested against the null hypothesis. When performing a hypothesis test, there is always the possibility of rejecting H_0 when it is true (type I error) or accepting H_0 when it is false (type II error). The best test is one in which the probability of both a type I and a type II error is small (6:102).

Methods of Analysis

All of the statistical methods used for this research were accomplished by use of the Statistical Package for the Social Sciences (SPSSx), Release 10. This section discusses the statistical methods used to achieve the research objectives.

Objective 1. The techniques used to answer the research questions in Objective 1 involved the use of descriptive statistics, correlation coefficients, and one-way analysis of variance (ANOVA).

1A. What are the general attitudes of Civil Engineering officers toward the Air Force way of life in terms of satisfaction?

Descriptive statistics were used to answer this research question in order to report the general attitudes of the Civil Engineering officers who responded to the survey. Descriptive statistics are a method of reporting information about the sample such as the mode, median, mean and frequency of response. The biggest drawback to using descriptive statistics is the inability to make inferences about the population (6:2). However, the use of descriptive statistics was considered adequate for assessing the attitudes of the respondents for this research effort.

Questions 37 through 59 from the survey instrument dealt with the individual's satisfaction with the Air Force. Since many of these questions investigate satisfaction rather indirectly, question 56 ("The Air Force is a great way of life") was chosen as the most direct measure. A frequency analysis was then performed on this question using the FREQUENCIES subroutine of SPSSx and the results are reported in Chapter four. The FREQUENCIES subroutine counts the number of responses in each category, and reports these responses in terms of percentages. For example, using FREQUENCIES it was determined that the sample consisted of 757 male respondents, or 93.9% of the sample, and 49 female respondents, or 6.1% of the sample.

1B. What factors of the Civil Engineering officer's personal background prior to military service are related to his or her satisfaction with the Air Force way of life?

In order to answer this research question, an accurate measure of Air Force satisfaction had to be developed. This measure was developed using correlation coefficients generated in an inter-correlation matrix of questions 37 through 59. Correlation coefficients measure the strength of the relationship between two or more variables. Devore suggests that a correlation coefficient with an absolute value between zero and 0.5 is weak (6:449). However, since the objective was to combine satisfaction responses into a measure of Air Force satisfaction, each response with a value of 0.40 or larger was selected for inclusion in the dependent variable of Air Force satisfaction.

Since question 56 addresses satisfaction with the Air Force in the most direct manner, it was chosen as the measure to which all other responses were compared. The responses that showed a correlation of 0.40 or greater with question 56 were then summed, along with question 56, to form the dependent variable of Air Force satisfaction.

A one-way ANOVA was then performed between this dependent variable of Air Force satisfaction and each independent variable of personal background. An ANOVA tests the hypothesis that there is no difference between the means of the responses in each category (6:344). For this research, the null hypothesis represents the belief that

there is no difference in levels of satisfaction between the categories for each factor of personal background. The ANOVA makes two fundamental assumptions. First, the two variables are independent of one another and second, the underlying population is normal (6:347-348). A level of significance (or the probability of a type I error) of 0.05 was chosen for the decision criteria to accept or reject the null hypothesis. Whether or not a relationship exists between the dependent and independent variables was determined by a comparison between the significance level and the P-value of the test. The P-value is a method of testing the null hypothesis by comparing significance levels, or as Devore states,

The P-value is really the chance, computed assuming H_0 true, of obtaining a more extreme value of the test statistic than the value actually obtained. Thus if $P = .003$, only .3% of the time would a more extreme value be observed if H_0 is true. This is why a very small P-value suggests that H_0 should be rejected [6:248].

Therefore, a P-value less than 0.05 indicated that the hypothesis of equal mean responses (satisfaction) should be rejected. The ONEWAY subroutine of SPSSx computes the P-value for the ANOVA.

Objective 2. The method used to answer this research objective is discussed below.

2. What factors of personal background are significantly related statistically to satisfaction with the Air Force?

The Scheffe multiple comparison procedure was used in order to answer this research question. In Research Objective 1, the ANOVA was able to determine if a relationship actually existed between satisfaction and personal background. However, it was not able to determine what this relationship is, or how significant the differences between levels of satisfaction really are. The Scheffe procedure tests whether or not the differences between the means of the responses identified in the ANOVA are significant. The Scheffe procedure measures differences between means at a significance level of 0.05 and is more conservative than other methods in that "it requires larger differences between means for significance than most of the other methods [15:112]". This more conservative method was chosen to assure only the strongest relationships would be identified. The Scheffe procedure was generated in the ONEWAY subroutine in SPSSx.

The results of the data analysis described in this chapter are presented and discussed in Chapter four.

IV. Results and Discussion

Introduction

This chapter presents the results of the data analysis described in Chapter three. In addition, a discussion of the results for each test is provided immediately following that particular test result. The data base containing the responses to the survey used in the data analysis is provided in Appendix B.

Demographics

Questions one through eight of the survey instrument solicited demographic information from the respondents. The responses of Civil Engineering officers by rank are presented in Table 1.

TABLE 1
Survey Respondents by Rank

<u>Rank</u>	<u>Number of Respondents</u>	<u>% of Sample</u>	<u>Actual %</u>
2Lt and 1Lt	337	41.7	44.1
Captain	268	33.1	35.0
Major	109	13.5	11.6
Lt Col	92	11.4	9.3
No Response	3	0.4	-

A random sample of a population should be in the same proportion as the population. Table 1 indicates that each rank is approximately represented in proportion to the population (8). The responses of lieutenants and captains

were slightly lower than expected, and those of majors and lieutenant colonels were slightly higher. However, these minor differences are not expected to have biased the results.

Although the other demographic information was not specifically addressed in this research, the results of the demographic solicitations are presented in Appendix C.

Data Analysis--Objective #1

This section will present and discuss the results obtained during the data analysis for Research Questions 1A and 1B. In each case, the applicable survey question is identified, followed by the results of the analysis and a brief discussion of those results.

Research Question 1A. What are the general attitudes of Civil Engineering officers toward the Air Force way of life in terms of satisfaction? As previously identified in Chapter three, survey question 56 (The Air Force is a great way of life) was considered the most direct measure of Air Force satisfaction. The results of the frequency analysis are presented in Table 2.

The information in Table 2 indicates that 59.4% of the respondents are satisfied with the Air Force way of life, while only 11.0% appear to be dissatisfied. As seen in Table 3, the results indicate that first lieutenants are the least satisfied group of respondents. This is in

TABLE 2

Satisfaction of Respondents

<u>Response</u>	<u>Number of Respondents</u>	<u>Percent</u>
Strongly disagree	22	2.7
Disagree	67	8.3
Neutral	232	28.7
Agree	387	47.8
Strongly agree	94	11.6
No response	7	.9

agreement with previous research that indicated a reduction in satisfaction after a couple of years of military service, and a gradual increase after the four-year point (2). This trend would appear to be caused by the attrition of less satisfied officers at the four-year point, thus increasing the proportion of satisfied officers after the initial commitment. The results of the analysis by rank are presented below in Table 3.

TABLE 3

Satisfaction of Respondents by Rank

<u>Rank</u>	<u>Disagree</u>	<u>Neutral</u>	<u>Agree</u>
2Lt	9.2%	32.5%	58.3%
1Lt	15.8%	36.9%	47.3%
Capt	10.5%	27.3%	62.2%
Maj	10.2%	22.4%	67.3%
Lt Col	5.4%	17.4%	77.1%

Research Question 1B. What factors of the Civil Engineering officer's personal background prior to military service are related to his or her satisfaction with the Air

Force way of life? The first step to answering this research question involved the development of an accurate measure of Air Force satisfaction. This was accomplished by generating an inter-correlation matrix of survey questions 37 through 59, and selecting those questions with a coefficient of 0.40 or larger with question 56. The correlation matrix of questions 37 through 59 is presented in Appendix D. These questions, along with question 56, were combined into a dependent variable of Air Force satisfaction by a summation of response values. The questions that were included in the dependent variable are listed below:

- 39. I plan on making the Air Force a career.
- 41. I feel very loyal to the Air Force.
- 42. I find my values and the values of the Air Force to be very similar.
- 44. The Air Force really inspires the very best in me in the way of job performance.
- 46. There's not much to be gained by staying in the Air Force indefinitely.
- 47. Deciding to join the Air Force was a definite mistake on my part.
- 50. The Air Force has a strong spirit of teamwork.
- 56. The Air Force is a great way of life.

Since the possible responses for each of these questions ranges from one to five, the range of response for the new dependent variable is from eight to 40 with a mean value of 24.

After the dependent variable was formed, a one-way analysis of variance (ANOVA) was performed on each factor of personal background in order to test the relationship with satisfaction. The results of each test are presented below along with a brief discussion of those results.

1. Type of High School. Survey question nine solicited information about the type of high school the respondent attended. The results of the ANOVA test for this factor and satisfaction yielded a P-value of 0.4159. Since this P-value exceeds the alpha (significance) level of 0.05, the null hypothesis that the means are equal for all categories could not be rejected.

The test for this factor indicated that there is not a strong relationship between satisfaction and the type of high school the Civil Engineering officer attended. One possible reason for this result is the number of respondents in each category. The number of respondents that attended public school was 702, or 89.3% of those responding to question nine. This left only 84 respondents in the other four categories. The imbalance of respondents in the categories may have affected the ANOVA test.

2. Junior ROTC. Question 10 investigated the respondents' participation in a high school junior Reserve Officer Training Corps program. The ANOVA test on this factor produced a P-value of 0.4734. This P-value was larger than the alpha level of 0.05, therefore the null hypothesis for this factor could not be rejected.

This result indicates that a definite relationship cannot be established between participation in junior ROTC and satisfaction with the Air Force. Only 5.9% of the respondents indicated that they had participated in a junior ROTC program, and the remaining 94.1% either did not participate or a program was not available. As with the type of high school attended, this large skew in responses may have affected the ANOVA test.

3. Sports. Survey question 11 asked respondents to report the kinds of sports they participated in during high school. When the ANOVA test was performed, a P-value of 0.8918 was obtained. This P-value was also larger than the alpha level of 0.05, therefore the null hypothesis of equal means between categories could not be rejected.

Since the null hypothesis cannot be rejected, this test indicates that the kinds of sports the Civil Engineering officer participated in cannot be shown to relate to his or her satisfaction.

4. High School Clubs. Question 12 asked respondents to report how many, if any, clubs they were involved in during high school. A P-value of 0.2788 was obtained from the ANOVA test, indicating that no relationship can be established between satisfaction and the amount of club participation.

5. Student Council. Survey question 13 dealt with the respondents' involvement in the high school student council. The one-way ANOVA test produced a P-value of 0.0208. Since

the P-value is less than the 0.05 alpha level, this test indicates that a relationship does exist between satisfaction with the Air Force and student council involvement. The mean response for each category is presented in Table 4.

While the test indicated a relationship between satisfaction and student council involvement, an inspection of the mean levels of satisfaction does not indicate a definite trend to this relationship. The responses seem to

TABLE 4
Satisfaction by Student Council Involvement

<u>Participation</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
None	553	28.9421
1 year or less	102	29.4902
2 years	71	27.7183
3 years	36	31.4167
4 years	22	28.9545

reveal an increase in satisfaction as participation increases, with the exception of the two-year and four-year categories. This inconsistency may have been caused by the relatively small numbers of respondents in the two-year through four-year categories.

6. Girl/Boy Scouts. Questions 14 and 15 were related to the respondents' participation in a scouting program. The ANOVA test for question 14 produced a P-value of 0.7955. Survey question 15, which identified the rank achieved for

participants in Boy Scouts, yielded a P-value of 0.1333. Neither of these P-values are smaller than the alpha of 0.05, therefore the null hypothesis could not be rejected in either case.

The results of this test indicate that no relationship can be established between satisfaction with the Air Force way of life and past participation in scouting. This conclusion was unexpected. Since scouting introduces a child to a regimented environment at a relatively young age, one would expect an individual who participated in scouting to be more comfortable, and therefore more satisfied, with the Air Force. However, as indicated by the results, this is not the case.

7. Father's Years of Service. Question 16 surveyed the number of years of military service for the respondent's father. The ANOVA test for this factor yielded a P-value of 0.4559. Since this P-value is larger than the alpha of 0.05, the null hypothesis that the mean levels of satisfaction for each category are equal, could not be rejected.

This test revealed that no relationship can be established between satisfaction and the father's years of military service. This result was also unexpected. It would seem intuitive that an individual who grew up around the military would be more satisfied than one who did not.

8. Father's Branch of Service. Question 17 asked respondents to report the branch of service in which their

fathers may have served. The ANOVA test produced a P-value of 0.3731. This P-value is larger than the alpha of 0.05, therefore the null hypothesis for this factor could not be rejected.

The results of this test indicated that a relationship between satisfaction and the father's branch of service cannot be established. This means that the branch of service a person's father served in has no significant affect on his or her satisfaction with the Air Force.

9. Mother's Years of Service. Question 18 surveyed the number of years of military service for the respondent's mother. The ANOVA test for this factor yielded a P-value of 0.4806. Since this P-value is larger than the alpha of 0.05, the null hypothesis that the mean levels of satisfaction for each catagory are equal, could not be rejected.

This test revealed that no relationship can be established between satisfaction and the mother's years of military service.

10. Mother's Branch of Service. Question 19 asked respondents to report the branch of service in which their mothers may have served. The ANOVA test produced a P-value of 0.1682. This P-value is larger than the alpha of 0.05, therefore the null hypothesis for this factor could not be rejected.

The results of this test indicated that a relationship between satisfaction and the mother's branch of service

cannot be established. This means that the branch of service a person's mother served in has no significant affect on his or her satisfaction with the Air Force.

11. Brothers and Sisters. Survey question 20 surveyed the number of brothers and sisters the respondents had while growing up. A P-value of 0.3428 was obtained from the ANOVA test, indicating that the null hypothesis for this factor could not be rejected.

This test indicated that the number of brothers and sisters an individual had while growing up bears no significant relationship to his or her satisfaction with the Air Force.

12. Single Parent. Question 21 asked respondents whether or not they were raised by a single parent. The ANOVA test calculated a P-value of 0.8301. This P-value, much larger than the alpha of 0.05, indicates that the null hypothesis cannot be rejected.

The results of this test showed that no relationship can be established between satisfaction and whether or not the Civil Engineering officer was raised by a single parent. However, the test may have been affected by the large proportion (93.2%) of respondents raised by both parents.

13. Father's Education. Survey question 22 asked respondents to report the level of their fathers' education. A P-value of 0.0083 was obtained from the ANOVA test. Since this P-value is lower than the 0.05 alpha level, the null hypothesis that the means for each category are equal can be

rejected.

Therefore, this test indicated that a relationship between satisfaction and the father's education does exist. The mean response for each category is presented below in Table 5.

TABLE 5
Satisfaction by Father's Education

<u>Education</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
Some High School	110	29.7091
High School Graduate	231	29.6450
Some College	177	29.1582
College Degree	140	27.9286
Graduate School and up	119	28.0756

With the exception of the last two groups, the mean values of satisfaction indicate a decreasing level of satisfaction as the father's level of education increases. In other words, the analysis indicates that the Civil Engineering officer who's father had a relatively high education, is likely to be less satisfied with the Air Force than the officer who's father was less educated.

14. Mother's Education. Similar to question 22, question 23 dealt with the level of the mother's education. The ANOVA for this factor produced a P-value of 0.0008, indicating that the null hypothesis should be rejected.

The P-value of 0.0008 indicates a relatively strong relationship between the mother's educational level and the

Civil Engineering officer's satisfaction. The mean levels of satisfaction for each category of educational achievement are presented in Table 6.

TABLE 6
Satisfaction by Mother's Education

<u>Education</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
Some High School	86	29.9070
High School Graduate	349	29.4527
Some College	174	28.9310
College Degree	124	28.3710
Graduate School and up	50	26.2200

Similar to the results for the father's education, the mean levels of satisfaction show a definite decreasing trend as the mother's level of education increases. The most severe reduction in satisfaction occurs at the level of graduate school or higher.

15. Age When First Considered Air Force Career.

Question 24 solicited information about this factor. The ANOVA calculated a P-value of 0.0007. Since this P-value is smaller than the alpha level of 0.05, the null hypothesis was rejected in favor of the alternate hypothesis.

The P-value obtained from the ANOVA indicates that a relationship does exist between satisfaction and the age at which the Civil Engineering officer first considered an Air Force career. The mean satisfaction levels for each age category are provided in Table 7.

The mean satisfaction values indicate that the individual's satisfaction is likely to be higher, given that he or she considered an Air Force career at a younger age. The information in Table 7 also indicates that those officers who never intended to make the Air Force a career are considerably less satisfied than those who did.

TABLE 7
Satisfaction by Age First
Considered Air Force Career

<u>Age</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
< 12	33	29.4848
12-16	129	29.4574
17-20	281	29.3950
> 20	246	29.1423
Never	94	26.6809

16. Size and Location of Home Town. Survey questions 25 and 26 respectively dealt with the size and geographical location of the respondent's home town. The ANOVA test produced a P-value of 0.9947 for question 25, and a P-value of 0.3645 for question 26. Neither of these P-values were less than the alpha level of 0.05, therefore the null hypothesis could not be rejected in either case.

The results of the tests for these factors indicated that no relationship can be established between satisfaction and the size or geographical location of the respondent's home town.

17. Living Overseas. Somewhat related to question 26,

question 27 investigated the number of years the respondent may have lived overseas. The ANOVA for this factor calculated a P-value of 0.2892, which indicates that the null hypothesis cannot be rejected given an alpha of 0.05.

This result indicates that no relationship can be established between satisfaction and the number of years the respondent may have lived overseas. This lack of a relationship was not particularly surprising since 82.3% of the respondents reported that they had never lived overseas.

18. Frequency of Moves. Question 28 asked respondents, by means of a Likert scale, whether or not they felt they moved around quite a bit as a child. The ANOVA between this factor and Air Force satisfaction yielded a P-value of 0.2478. Since this P-value is larger than the alpha of 0.05, the null hypothesis cannot be rejected.

The results of this test indicate that no relationship can be established between satisfaction and the frequency of moves as a child.

19. Frequency of Travel. Question 29 surveyed the respondents to determine whether or not they felt they traveled quite a bit as a child. A P-value of 0.0824 was obtained from the ANOVA test for this factor. While this factor was close to the alpha of 0.05, it was still too large so the null hypothesis could not be rejected.

This test indicated that a relationship cannot be established between travel and Air Force satisfaction.

20. Jobs Held During School Years. Survey questions

30 and 31 dealt with employment of the respondents during the high school years. Question 30 asked respondents to report on their employment as teenagers, including summer jobs, whereas question 31 dealt specifically with jobs held during the school year. The P-values obtained for questions 30 and 31 were 0.0806 and 0.1831, respectively. Neither of these P-values were smaller than the alpha level of 0.05, therefore the null hypothesis of equal means could not be rejected in either case.

This test revealed that no relationship can be established between satisfaction and the Civil Engineering officer's employment as a child.

21. Independence. Question 32 asked respondents to report whether or not they felt their parents had fostered their independence as a child. A P-value of 0.0831 was obtained, indicating that the null hypothesis could not be rejected in favor of the alternate hypothesis.

The P-value obtained for this factor indicates that a relationship cannot be established between satisfaction and an early fostering of independence does not exist.

22. Strictness of Upbringing. Survey question 33 investigated the respondents' views of the strictness of their parents' methods of child-rearing. The ANOVA performed for this factor produced a P-value of 0.0001. Since this P-value is considerably lower than the alpha of 0.05, the null hypothesis was rejected in favor of the alternate hypothesis.

The results of this test indicate that there is a relationship between satisfaction and the strictness of the officer's upbringing. The mean levels of satisfaction for each response category are presented in Table 8.

From the information in Table 8, an increase in the level of satisfaction can be seen as the individual's upbringing becomes relatively more strict. The most

TABLE 8
Satisfaction by Strictness of Upbringing

<u>Response</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
Strongly disagree	10	28.7000
Disagree	123	28.2033
Neutral	269	28.3457
Agree	293	29.1911
Strongly agree	68	31.4773

considerable difference lies between those respondents who agreed, and those who strongly agreed with the statement in question 33.

23. Parent Permissiveness. Question 34 dealt specifically with the respondents' views of their parents' permissiveness. The ANOVA produced a P-value of 0.1153, which is less than the alpha of 0.05 for this research. Therefore, the null hypothesis for this factor could not be rejected.

This test indicated that no relationship can be established between the parents' relative permissiveness and

the Civil Engineering officer's satisfaction with the Air Force.

24. Background. Question 35 specifically asked the respondents if they felt their childhood background prepared them well for a military career. The P-value obtained from the ANOVA on the SPSSx package was so small that it was reported as 0.0000. Since this P-value was smaller than the alpha of 0.05, the null hypothesis was rejected.

This result indicates that there is a definite relationship between satisfaction and the individual's perceived adequacy of his or her upbringing to a military career. The mean levels of satisfaction for each response category are provided below in Table 9.

TABLE 9
Satisfaction by Perceived
Background Adequacy

<u>Response</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
Strongly disagree	22	25.1364
Disagree	85	26.4000
Neutral	291	28.3436
Agree	283	29.5477
Strongly agree	104	32.4231

The results in Table 9 indicate a positive relationship between this factor and Air Force satisfaction. That is, as the individual's agreement that his background prepared him for a military career increases, so does his level of satisfaction.

25. Home Town Image of Military Officers. Survey question 36 asked respondents to report the general attitude of his home town toward the military officer. Again, the P-value obtained was so small that it was reported as 0.0000. Since this P-value was smaller than the required alpha level, the null hypothesis for this factor was rejected in favor of the alternate hypothesis.

This test indicated a definite relationship between the image of the military officer in the individual's home town and his or her satisfaction with the Air Force. The mean levels of satisfaction for each response category are presented in Table 10.

TABLE 10
Satisfaction by Home Town
Image of Military Officer

<u>Response</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
Strongly disagree	23	25.1304
Disagree	67	26.8358
Neutral	351	28.6952
Agree	252	29.5397
Strongly agree	90	31.1556

The results in Table 10 indicate a positive relationship between satisfaction and the individual's home town image of the military officer. The better the image of the military officer in the individual's home town, he or she is likely to be more satisfied.

Data Analysis--Objective #2

This section will present and discuss the results obtained during the data analysis for research question 2. The format for the presentation of the results is the same as for Objective #1. The applicable survey question is identified, followed by the results of the data analysis, and a brief discussion of those results wherever necessary.

Research Question 2. What factors of personal background are significantly related statistically to satisfaction with the Air Force? Objective #1 identified the factors that are related to satisfaction using the P-value test. The purpose of Objective #2 was to identify which of these related factors contain significant differences between the mean levels of satisfaction for each category. While the P-value obtained in the ANOVA indicates "significance" of the factor in the strictest sense (Devore:271), the thrust of this research objective was to identify significant differences within the factors.

In order to answer this research question, the Scheffe multiple comparison procedure was used on the factors that were found to be related to the Civil Engineering officer's satisfaction with the Air Force. The factors that were found to be related are summarized as follows:

<u>Question</u>	<u>Factor</u>
13	Student council involvement
22	Father's education
23	Mother's education
24	Age first considered Air Force career
33	Strictness of upbringing
35	Perceived background adequacy
36	Home town image of military officer

The Scheffe procedure identified significant differences between the mean values of satisfaction, at a significance level of 0.05, for all factors identified above except father's education. The results of the Scheffe procedure for each factor are discussed below.

1. Student Council. The Scheffe procedure identified a significant difference between the means for the third and fourth catagories of this factor. This result equates to a significant difference between the levels of satisfaction for those individuals who served two years on the student council, and those who served three years. The satisfaction trends, as well as possible limitations, for this factor have already been discussed.

2. Mother's Education. The Scheffe procedure for this factor identified a significant difference between means for the first and fifth catagories, and the second and fifth catagories for this factor. In other words, the level of satisfaction for an individual whose mother attended graduate school or higher, is significantly less than one whose mother had no more than a high school education.

3. Age First Considered Air Force Career. The

multiple comparison for this factor identified significant differences between categories two and five, three and five, and four and five. The results of this test indicate a definite, and significant, decrease in satisfaction with an increase in the age at which the individual first considered an Air Force career.

4. Strictness of Upbringing. The Scheffe procedure identified significant differences between the means for categories two and five, three and five, and four and five. The result of this comparison indicates a significant increase in the level of satisfaction with an increase in the strictness of the parents' child-rearing methods.

5. Background. The results of the Scheffe procedure for this factor are presented in Table 11. In each case, an asterisk (*) identifies the significant differences between categories.

TABLE 11
Scheffe Comparison for
Perceived Background Adequacy

Response	1	2	3	4	5
1					
2					
3					
4		*	*		
5		*	*	*	*

This test indicated a significant increase in satisfaction as the level of agreement that the person's

background prepared him or her for a military career increased.

6. Home Town Image of Military Officer. The results of the Scheffe procedure for this factor are presented in Table 12. Again, an asterisk indicates a significant difference between catagories.

TABLE 12
Scheffe Comparison for
Home Town Image of Military Officer

Response	1	2	3	4	5
1					
2					
3					
4		*	*		
5		*	*	*	

The comparison test for this factor indicated a significant increase in Air Force satisfaction as the home town image of the military officer became more positive.

This chapter presented the results of the data analysis used to answer the Research Objectives, as well as a discussion of those results. Chapter five discusses the conclusions drawn from this research effort and makes recommendations for future research in this area.

V. Conclusions and Recommendations

Introduction

This research effort investigated the relationship between satisfaction with the Air Force and personal background characteristics of the Civil Engineering officer. The conclusions drawn from this study are discussed in this chapter. Finally, recommendations for future research in this area are presented.

Research Objective #1

To identify the personal background factors that are related to satisfaction with the Air Force.

While this research is not an effective tool in itself for measuring the Civil Engineering officer's satisfaction with the Air Force, this study did establish a path for future research in this area. As stated in Chapter one, the underlying problem that guided this research was that of retention of Civil Engineering officers during periods of high demand in the civilian sector. If the link between satisfaction with the Air Force and retention can be established in future research, one possible outcome could be a predictive model of retention based on objective measures of personal background. This model could prove invaluable to the manpower community during periods of intensive recruiting efforts. Instead of focusing on sheer numbers of recruits, Air Force recruiters could focus their

efforts toward individuals with a higher probability of satisfaction and retention during these periods of high civilian demand. This way, the Air Force can work smarter, not harder, at keeping a quality force in the Civil Engineering officer corps.

Seven personal background factors were statistically determined to be related to the Civil Engineering officer's satisfaction with the Air Force. These factors were student council involvement, father's education, mother's education, age first considered an Air Force career, strictness of upbringing, perceived background adequacy, and the home town image of the military officer.

The data indicated a generally increasing level of satisfaction as the officer's involvement in the high school student council increased. However, the data for this factor contained inconsistent trends at the two and four year levels of involvement. The data for the education of the officer's parents showed a definite decrease in satisfaction as the parents' level of education increased. As the officer's age at which he first considered an Air Force career decreased, the results indicated an increase in his level of satisfaction with the Air Force. The data also indicated an increase in satisfaction as the strictness of the officer's upbringing increased - one of the more interesting results. The results of the investigation of the officer's perception of the adequacy of his background yielded a positive relationship between his satisfaction and

his pereceptions. Finally, as expected, the image of the military officer in the individual's home town is positively related to his or her satisfaction with the Air Force.

Other Conclusions. Although not identified in this research objective, the one-way analysis of variance (ANOVA) was also performed on the respondents' demographic information. The results of these tests yielded some interesting findings. The most interesting of these was the test between satisfaction and the respondent's source of commission. The test produced a P-value of 0.0363, indicating that a relationship does exist. The mean levels of satisfaction for the different catagories are presented in Table 13. This information indicates that Civil Engineering officers who graduated from the Air Force Academy are the least satisfied with the Air Force. Officers who received their commissions from Officer Training School (OTS) or Officer Candidate School (OCS) appear to be the most satisfied, while those who were commissioned through the Reserve Officer Training Corps

TABLE 13
Satisfaction by Source
of Commission

<u>Source</u>	<u>Number of Respondents</u>	<u>Mean Level of Satisfaction</u>
ROTC	397	28.7632
OTS/OCS	317	29.5300
AF Academy	68	27.6618
Other	3	32.0000

(ROTC) were in the middle. Since this research was exploratory in nature, it would be inappropriate to make conjectures on the possible causes of this trend.

As expected, the ANOVA test results for age and rank yielded a positive relationship with satisfaction. As the individual gets older and advances in rank, his or her level satisfaction with the Air Force increases.

Research Objective #2

To identify which factors of personal background are statistically significant in relation to satisfaction with the Air Force.

Of the seven factors identified to be related to satisfaction, all but the father's education were found to be statistically significant using the Scheffe multiple comparison procedure. The purpose of this research objective was to further scrutinize the factors in order to consider them significant. The Scheffe procedure was used since it is the most conservative multiple comparison procedure. These factors would be candidates for inclusion in the predictive model of retention identified under Research Objective #1.

Recommendations for Future Research

The following are a few recommendations for research in areas related to this effort:

1. Perhaps the most logical follow-on research to this

effort would be an investigation of the link between attitudes and behavior in the Ajzen and Fishbein basic model of behavior (1:8). Several other factors would have to be included, such as economic and family considerations, for the model to be an accurate predictor of intentions. Establishing this link in the chain could provide an objective measurement of future satisfaction and retention possibilities.

2. Further investigation of the relationship between satisfaction and the parents' education. While this research established a relationship, it is still unclear what factors of the parents' educational level affect the offspring's satisfaction with the Air Force. Before this factor can be used in a predictive model, the extent of this relationship should be fully investigated. Future studies may combine the education levels of the father and the mother instead of treating each separately.

3. An in-depth study of the relationship between satisfaction with the Air Force and the strictness of the individual's upbringing may provide valuable information on the development of values and how they affect the Civil Engineering officer. Similar to parents' education, this factor should be investigated in more depth to determine the extent of the relationship before including it in a predictive model.

4. Further study of the relationship between satisfaction and the individual's source of commission may

bring new insight into retention problems for Air Force Academy graduates. Research may also uncover the reasons for the high level of satisfaction for graduates of OTS or OCS.

5. A similar study may be conducted in order to identify other elements of personal background that may be related to satisfaction. For example, involvement in the Civil Air Patrol (CAP) and other organizations may affect the officer's satisfaction with the Air Force.

Summary

This research identified personal background factors that are related to the Civil Engineering officer's satisfaction with the Air Force way of life. In doing this, an effective measure of Air Force satisfaction was developed instead of attempting to use established measures of job satisfaction. This study also established a foundation upon which a predictor of retention based on personal background may be developed.

Appendix A: Survey Instrument



DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY
WRIGHT-PATTERSON AIR FORCE BASE OH 45433-6563

6 MAY 1986

REPLY TO
ATTN OF: LS

SUBJECT: Survey on the Relationship Between Personal Background and
Satisfaction with the Air Force

TO: Air Force Civil Engineering Officers

1. Turnover of Air Force civil engineering officers has been a major issue of concern for the manpower community. Among other factors, similarities between personal and organizational values have been shown to affect job satisfaction. We are interested in your attitudes toward the Air Force way of life and a few aspects of your personal background that may affect your satisfaction with the Air Force. The attached survey was prepared to meet that need.
2. Your participation is voluntary, and your responses will be completely anonymous. Please do not put your name or social security number anywhere on the machine scored response form (AFIT Form 11B). When the results of the study are published, readers will in no way be able to identify specific individuals.
3. Please complete the survey and return it to AFIT/LSG in the enclosed envelope within ten working days. If you have any questions, contact Capt John Borland at Autovon 785-4437.
Thanks for your cooperation and participation.

A handwritten signature in cursive script, reading "Larry L. Smith", is positioned above the typed name.

LARRY L. SMITH, Colonel, USAF
Dean
School of Systems and Logistics

- 3 Atch
1. Survey
 2. AFIT Form 11B
 3. Return Envelope

Please answer the following questions as accurately as possible. The responses are completely anonymous and will not be used for anything other than this research.

1. What is your sex?
 1. Male
 2. Female
2. What is your rank?
 1. 2Lt
 2. 1Lt
 3. Capt
 4. Major
 5. LTCol
3. How old are you?
 1. Less than 24
 2. 24 to 29
 3. 30 to 35
 4. 36 to 39
 5. 40 or older
4. What was your source of commission?
 1. ROTC
 2. OTS or OCS
 3. Air Force Academy
 4. Other
5. What type of commission do you currently hold?
 1. Regular
 2. Reserve
6. What is your current MAJCOM assignment?
 1. TAC
 2. MAC
 3. SAC
 4. ATC
 5. Other
7. What is your current level of assignment?
 1. Base level
 2. MAJCOM
 3. Air Staff
 4. Other
8. In what geographical location are you currently assigned?
 1. Northeast (New England, NY, PA, NJ, etc.)
 2. South (VA, KY, TN, MS, LA, FL, etc.)
 3. Midwest (ND, KS, OK, TX, MO, OH, etc.)
 4. West (CO, WY, CA, NV, HA, AK, WA, etc.)
 5. Other (Overseas, etc.)

The following questions are designed to measure certain aspects of your personal background. Again, the responses to these questions are completely anonymous. Please answer them as accurately as possible.

9. The high school I attended was:
 1. public
 2. private - church sponsored
 3. private - military academy
 4. private - no affiliations
 5. other
10. Were you actively involved in your high school's junior ROTC program?
 1. My school did not have a ROTC program
 2. Yes
 3. No
11. The kinds of sports I participated in most at high school were:
 1. Team sports (football, basketball, etc.)
 2. Individual sports (track, tennis, etc.)
 3. Intramural sports
 4. I did not participate in organized sports
12. How active were you in high school clubs?
 1. Did not participate in club activities
 2. 1 or 2 clubs
 3. 3 to 5 clubs
 4. More than 5 clubs
13. How active were you in the high school student council?
 1. Did not participate
 2. Served 1 year or less
 3. Served 2 years
 4. Served 3 years
 5. Served 4 years
14. Were you involved in Girl/Boy Scouts?
 1. Yes
 2. No
15. What was the highest rank you attained in Boy Scouts?
 1. First Class or lower
 2. Star
 3. Life
 4. Eagle
 5. Did not participate in Boy Scouts

16. How many years of military service does your father have?
1. He was not in the service
 2. 4 years or less
 3. 5 to 10 years
 4. 11 to 20 years
 5. More than 20 years
17. In what branch of service did your father serve?
1. Did not serve
 2. Air Force
 3. Navy
 4. Army or Marines
 5. Guard or Reserve
18. How many years of military service does your mother have?
1. She was not in the service
 2. 4 years or less
 3. 5 to 10 years
 4. 11 to 20 years
 5. More than 20 years
19. In what branch of service did your mother serve?
1. Did not serve
 2. Air Force
 3. Navy
 4. Army or Marines
 5. Guard or Reserve
20. How many brothers and sisters did you have living at home when you were growing up?
1. No brothers or sisters
 2. 1 or 2
 3. 3 or 4
 4. 5 to 7
 5. More than 7
21. If you were raised by a single parent, which parent raised you?
1. I was raised by both parents
 2. Mother
 3. Father
 4. Guardian
 5. Other
22. How would you describe your father's highest level of education to the best of your knowledge?
1. Some high school
 2. High school graduate
 3. Some college (including associate's degree)
 4. College degree (4 or 5 year)
 5. Graduate school or higher

23. How would you describe your mother's highest level of education to the best of your knowledge?
1. Some high school
 2. High school graduate
 3. Some college (including associate's degree)
 4. College degree (4 or 5 year)
 5. Graduate school or higher
24. At what age did you first consider a career in the Air Force?
1. Less than 12 years old
 2. 12 to 16 years old
 3. 17 to 20 years old
 4. Over 20 years old
 5. I never intended to make the Air Force a career
25. What size was the town(s) where you grew up (population)?
1. Less than 10,000
 2. 10,000 to 50,000
 3. 50,000 to 100,000
 4. 100,000 to 500,000
 5. More than 500,000
26. Which geographical area would you say you grew up in?
1. Northeast (New England, NY, PA, NJ, etc.)
 2. South (VA, KY, TN, MS, LA, FL, etc.)
 3. Midwest (ND, KS, OK, TX, MO, OH, etc.)
 4. West (CO, WY, CA, NV, HA, AK, WA, etc.)
 5. Other (Overseas, etc.)
27. How many years did you live overseas as a child?
1. Did not live overseas as a child
 2. Less than 1 year
 3. 1 to 5 years
 4. 6 to 10 years
 5. More than 10 years

Please use the following scale when answering the questions listed below:

STRONGLY DISAGREE	DISAGREE	NEITHER AGREE OR DISAGREE	AGREE	STRONGLY AGREE
1	2	3	4	5

28. As a child, my family moved around quite a bit.
29. I traveled with my family quite a bit when I was a child.

30. I usually had a job when I was in my teens (including farm work).
31. In high school, I worked during the school year.
32. My parents fostered my independence.
33. I would say my parents' methods of child-rearing were strict.
34. My parents let me do pretty much whatever I wanted to.
35. I feel my childhood background prepared me well for a military career.
36. Back in my hometown, the career military officer has a good image.
37. I enjoy working in the civil engineering career field.
38. I work very hard at my job.
39. I plan on making the Air Force a career.
40. I consider myself an engineer first and an Air Force officer second.
41. I feel very loyal to the Air Force.
42. I find my values and the values of the Air Force to be very similar.
43. I could just as well be working for a civilian organization as long as the type of work is similar.
44. The Air Force really inspires the very best in me in the way of job performance.
45. It would take very little change in my present circumstances to cause me to leave the Air Force.
46. There's not much to be gained by staying in the Air Force indefinitely.
47. Deciding to join the Air Force was a definite mistake on my part.
48. Military rituals, traditions, and symbols are no longer important in today's highly technical military environment.

49. If I suddenly became a millionaire, I would not change my military career plans.
50. The Air Force has a strong spirit of teamwork.
51. I have a deep personal commitment, a "calling," to serve the nation in the Air Force.
52. The major satisfaction in my life comes from my job.
53. For me, the mornings at work really fly.
54. I usually show up at work a little early, to get things ready.
55. I have other activities more important to me than my Air Force work.
56. The Air Force is a great way of life.
57. I live, eat, and breathe my job.
58. I believe that working hard at what I do will get me promoted.
59. I find my military pay, including benefits, to be competitive with the private sector.

Appendix B: Data Base

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Appendix C: Demographics

TABLE 14

Survey Respondents by Sex

<u>Sex</u>	<u>Number of Respondents</u>	<u>Percent</u>
Male	757	93.6
Female	49	6.1
No Response	3	0.4

TABLE 15

Survey Respondents by Age

<u>Age</u>	<u>Number of Respondents</u>	<u>Percent</u>
< 24	55	6.8
24-29	331	40.9
30-35	185	22.9
36-39	108	13.3
40 and older	125	15.5
No Response	5	0.6

TABLE 16

Survey Respondents by Source of Commission

<u>Source</u>	<u>Number of Respondents</u>	<u>Percent</u>
ROTC	407	50.3
OTS or OCS	325	40.2
AF Academy	68	8.4
Other	4	0.5
No Response	5	0.6

TABLE 17

Survey Respondents by Type
of Commission

<u>Type</u>	<u>Number of Respondents</u>	<u>Percent</u>
Regular	430	53.2
Reserve	374	46.2
No Response	5	0.6

TABLE 18

Survey Respondents by Major
Command (MAJCOM) Assignment

<u>MAJCOM</u>	<u>Number of Respondents</u>	<u>Percent</u>
TAC	138	17.1
MAC	69	8.5
SAC	157	19.4
ATC	81	10.0
Other	361	44.6
No Response	3	0.4

TABLE 19

Survey Respondents by Level
of Assignment

<u>Level</u>	<u>Number of Respondents</u>	<u>Percent</u>
Base	460	56.9
MAJCOM	110	13.6
Air Staff	75	9.3
Other	157	19.4
No Response	3	0.4

TABLE 20

Survey Respondents by Current
Geographical Location

<u>Area</u>	<u>Number of Respondents</u>	<u>Percent</u>
Northeast	69	8.5
South	235	29.0
Midwest	271	33.5
West	218	26.9
Other	14	1.7
No Response	2	0.2

Appendix D: Correlation Matrix

CORRELATION MATRIX

	Q37	Q38	Q39	Q40	Q41
Q37	1.0000				
Q38	.3958	1.0000			
Q39	.3818	.3330	1.0000		
Q40	.0505	.1738	.3558	1.0000	
Q41	.3620	.3993	.3939	.2470	1.0000
Q42	.3437	.3022	.3713	.2089	.5716
Q43	.0167	.0685	.2734	.3024	.1782
Q44	.3637	.3186	.3897	.2191	.4150
Q45	.3033	.1719	.4846	.2532	.3302
Q46	.1827	.1105	.3453	.2894	.2778
Q47	.3588	.3090	.3485	.2567	.4299
Q48	.1420	.1111	.1878	.3501	.2570
Q49	.1647	.1922	.1474	.0697	.2222
Q50	.2345	.1820	.2467	.1791	.3417
Q51	.1667	.2737	.3680	.2863	.4125
Q52	.2975	.2764	.2303	.1115	.2101
Q53	.3468	.4475	.2281	.1337	.2661
Q54	.2355	.3320	.2736	.1766	.2484
Q55	.2283	.2134	.2059	.1563	.2547
Q56	.3662	.2786	.4581	.3102	.4915
Q57	.2727	.2799	.3016	.1800	.2189
Q58	.1850	.1362	.1752	.1784	.2905
Q59	.1027	.0196	.0867	.0699	.1117

CORRELATION MATRIX (CONT.)

	Q42	Q43	Q44	Q45	Q46
Q42	1.0000				
Q43	.1170	1.0000			
Q44	.4579	.1612	1.0000		
Q45	.3397	.2615	.3766	1.0000	
Q46	.3343	.2341	.3575	.4487	1.0000
Q47	.3607	.1857	.3621	.4033	.3613
Q48	.2328	.2183	.1890	.2465	.3624
Q49	.1783	.1688	.2048	.1558	.0904
Q50	.3634	.0874	.4092	.2694	.2615
Q51	.3256	.2799	.3047	.1779	.2369
Q52	.2622	.1053	.2999	.1776	.0484
Q53	.2658	.0596	.2917	.1332	.1181
Q54	.1802	.1255	.2334	.1040	.0961
Q55	.2461	.1342	.2571	.1520	.1502
Q56	.5163	.2148	.4903	.3967	.4184
Q57	.2076	.1915	.3551	.1805	.1428
Q58	.3250	.1134	.3592	.2949	.3454
Q59	.1207	.0573	.1321	.1140	.2033

CORRELATION MATRIX (CONT.)

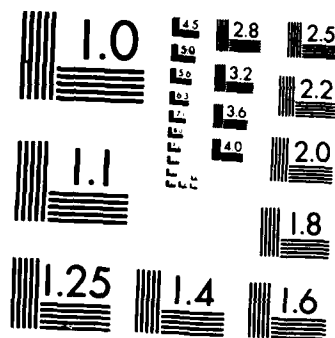
	Q47	Q48	Q49	Q50	Q51
Q47	1.0000				
Q48	.3570	1.0000			
Q49	.1313	.1469	1.0000		
Q50	.3372	.2535	.0730	1.0000	
Q51	.2605	.2809	.3017	.2372	1.0000
Q52	.1772	.0388	.1998	.2011	.2626
Q53	.2824	.1061	.1444	.1794	.2253
Q54	.1664	.1150	.2154	.1306	.2838
Q55	.2040	.1268	.1628	.2022	.2018
Q56	.4648	.3277	.2427	.4209	.3299
Q57	.1807	.1219	.2619	.1708	.2879
Q58	.2926	.2312	.0795	.3485	.1416
Q59	.1071	.1311	.0609	.1307	-.0040
<hr/>					
	Q52	Q53	Q54	Q55	Q56
Q52	1.0000				
Q53	.3082	1.0000			
Q54	.2566	.4061	1.0000		
Q55	.4600	.2361	.1516	1.0000	
Q56	.1980	.2783	.2342	.2022	1.0000
Q57	.4536	.3817	.3397	.3892	.2648
Q58	.1087	.1574	.1590	.1536	.4097
Q59	.0857	.0526	.0515	.0547	.1845

CORRELATION MATRIX (CONT.)

	Q57	Q58	Q59
Q57	1.0000		
Q58	.1782	1.0000	
Q59	.1221	.1486	1.0000

AD-A174 423 AN INVESTIGATION OF PERSONAL BACKGROUND FACTORS RELATED 2/2
TO THE CIVIL ENGI (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST J K BORLAND
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Vita

Captain John K. Borland was born 1 July 1958 in Harlingen, Texas. He graduated from high school in Las Vegas, Nevada in 1976 and attended his first year of college at the University of Nevada. Captain Borland received the degree of Bachelor of Science in Civil Engineering from the University of Kansas in December 1981. Upon graduation, he received a commission in the USAF through the ROTC program. He was employed as a construction engineer for the Daniel International Construction Company at New Strawn, Kansas until called to active duty in June 1982. Captain Borland joined the 3750th Civil Engineering Squadron (CES) at Sheppard AFB, Texas where he served as a design engineer and the Chief of Readiness for the squadron. He entered the AFIT Graduate Engineering Management program in May 1985 and upon graduation was assigned to the 26th CES at Zweibrucken ABS, Germany.

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The intent of this research was to gather sufficient data to determine the relationship between personal background and the Civil Engineering Officer's satisfaction with the Air Force way of life. A total of 809 Civil Engineering Officers were surveyed to gather demographic and personal background information and to assess their level of satisfaction with the Air Force. The relationship between personal background and satisfaction was investigated using a one-way analysis of variance (ANOVA) between satisfaction and each factor of personal background. The results identified seven factors that are related to satisfaction with the Air Force. These factors were student council involvement, father's education, mother's education, age first considered an Air Force career, strictness of upbringing, perceived background adequacy, and the home town image of the military officer.

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